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## REVIEWS

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*Climate and Evolution.* By W. D. MATTHEW. *Annals of the New York Academy of Science*, Vol. XXIV, pp. 171-318.

This important paper is notable for the emphasis it lays on climatic variations and physical changes as agencies dominating organic evolution, for its adherence to the essential permanency of the continents, and for its unhesitating rejection of oceanic eversions and of extravagant bridge-building across abysmal depths for mere convenience in explaining biological distribution. In all these the author is loyal to the agencies attested by the geologic record and declines to go beyond them in summoning agencies of which the record gives no substantial authentication. He appeals to the powerful influence of climatic oscillations running back over the whole history of vertebrate life and beyond, whose verity is being constantly supported afresh by new evidence, and to the co-operative influence of physical changes connected with periodic diastrophism and denudation which have constantly varied the environment of life.

In addition to the long-recognized evidences of the essential permanency of the continents, the author cites the new support that springs from the geodetic evidences of isostasy and accepts all the difficulties this may seem to impose on the elucidation of biologic distribution. The author turns some of these supposed difficulties into evidences of the permanence of the ocean basins, by citing the obvious fact that a bridge between two great land masses should give a normal intermingling of the two faunas and floras inhabiting them and not a meager selection of forms susceptible of abnormal distribution by occasional modes of transportation. In this the author makes a notable contribution to the more critical study of what abnormal distribution really means. To the reviewer it seems probable that a really critical analysis of most cases of animal and plant distribution that are not in obvious harmony with the existing embossments and ridges, submerged or unsubmerged, will be found to imply selective transportation, not the normal commingling of species that naturally arises from a physical connection available to all species. The author's contribution to a closer scrutiny of the biological evidences of anomalous distribution is one of the first order of value. For its details the reader must consult the paper itself.

In his rejection of hypothetical eversions of ocean basins, the author does not hesitate to include Gondwana-Land, in some sense the parent—the mythical Atlantis aside—of the whole brood of lost continents. In this the author is likely to be sustained by stratigraphic and glacial evidence now already grown to a considerable mass which testifies, as well as bordering evidence well can, to the absence of any such elevated land connection between Australia, India, and South Africa across the Indian Ocean as is so commonly postulated to account for biologic distribution and the remarkable glaciation of those regions in Permo-Carboniferous times. In the opinion of the reviewer the stratigraphic and glacial evidences are not only quite against such intervening continent, but the hypothesis increases rather than alleviates the difficulties of explaining Permo-Carboniferous glaciation in those strange latitudes, and surely the difficulties are formidable enough without such hypothetical embarrassment.

The author does not push his negative attitude toward diastrophic extravagances farther back than Gondwana-Land because his study of vertebrate evolution does not seem to require it, but he might well have carried it back to the strange apparition of fishes and fishlike forms. Because coarse Devonian sediments with ichthyic faunas and terrestrial floras are found to encircle, in an imperfect way, the North Atlantic basin, an Atlantis is postulated in disregard of the strictly logical interpretation of both the physical and biological evidence which implies a disruption of the basin border, with a probable accentuation of the basin itself, instead of its eversion with the extremely improbable reversal of diastrophic action involved.

It is of course not improbable that some geomorphic changes of considerable importance have affected the ocean basins and the continental embossments in the course of geologic history, and possibly some of these may have been vital factors in the distribution of life, but the conservative example of the author in endeavoring to exhaust the probable influences of known fluctuations of milder type, attested by their own credentials, before resorting to colossal changes devoid of an appropriate record of their own, is wholesome and highly commendable. The paper should be read for its method as well as its material.

T. C. C.

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*The Noatak-Kobuk Region, Alaska.* By PHILIP S. SMITH. Bull. U.S. Geol. Surv. No. 536, 1913. Pp. 157.

This report deals with the geology along the Noatak and Kobuk rivers which drain an area included approximately between 154° and 156° west longi-